

## HW Worksheet 6.3

### Operations with Functions – Algebra 2

Perform the following operations when  $f(x) = x^2 + 5x$  and  $g(x) = 4x - 7$ .

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| <p>1. <math>f(x) + g(x)</math></p> $(x^2 + 5x) + (4x - 7)$ $x^2 + 9x - 7$                                    | <p>2. <math>f(x) - g(x)</math></p> $(x^2 + 5x) - (4x - 7)$ $x^2 + 5x - 4x + 7$ $x^2 + x + 7$  |
| <p>3. <math>f(x) \cdot g(x)</math></p> $(x^2 + 5x)(4x - 7)$ $4x^3 - 7x^2 + 20x^2 - 35x$ $4x^3 + 13x^2 - 35x$ | <p>4. <math>g(x) - f(x)</math></p> $(4x - 7) - (x^2 + 5x)$ $4x - 7 - x^2 - 5x$ $-x^2 - x - 7$ |

Evaluate the function,  $f(x) = 3x^2 - 8$ , for the following values or expressions.

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| <p>5. <math>f(4) = 3(4)^2 - 8</math></p> $= 3(16) - 8$ $= 48 - 8$ $= 40$  | <p>6. <math>f(-2) = 3(-2)^2 - 8</math></p> $= 3(4) - 8$ $= 12 - 8$ $= 4$     | <p>7. <math>f(0) = 3(0)^2 - 8</math></p> $= 3(0) - 8$ $= 0 - 8$ $= -8$   |
| <p>8. <math>f(\odot) = 3(\odot)^2 - 8</math></p>                          | <p>9. <math>f(\star) = 3(\star)^2 - 8</math></p>                             | <p>10. <math>f(\\$) = 3(\\$)^2 - 8</math></p>  |
| <p>11. <math>f(2y) = 3(2y)^2 - 8</math></p> $= 3(4y^2) - 8$ $= 12y^2 - 8$ | <p>12. <math>f(-4m) = 3(-4m)^2 - 8</math></p> $= 3(16m^2) - 8$ $= 48m^2 - 8$ | <p>13. <math>f(y+2) = 3(y+2)^2 - 8</math></p> $= 3(y+2)(y+2) - 8$ $= 3(y^2 + 4y + 4) - 8$ $= 3y^2 + 12y + 12 - 8$ $= 3y^2 + 12y + 4$   |
| <p>14. <math>f(2x) = 3(2x)^2 - 8</math></p> $= 3(4x^2) - 8$ $= 12x^2 - 8$ | <p>15. <math>f(5x) = 3(5x)^2 - 8</math></p> $= 3(25x^2) - 8$ $= 75x^2 - 8$   | <p>16. <math>f(x-4) = 3(x-4)^2 - 8</math></p> $= 3(x-4)(x-4) - 8$ $= 3(x^2 - 8x + 16) - 8$ $= 3x^2 - 24x + 48 - 8$ $= 3x^2 - 24x + 40$ |

Find the following composite functions given  $f(x) = x^2 - 3$  and  $g(x) = 2x + 1$ .

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| $17. f(g(x)) = (2x+1)^2 - 3$ $= (2x+1)(2x+1) - 3$ $= 4x^2 + 4x + 1 - 3$ $= 4x^2 + 4x - 2$            | $18. g(f(x)) = 2(x^2 - 3) + 1$ $= 2x^2 - 6 + 1$ $= 2x^2 - 5$ |
| $19. f(f(x)) = (x^2 - 3)^2 - 3$ $= (x^2 - 3)(x^2 - 3) - 3$ $= x^4 - 6x^2 + 9 - 3$ $= x^4 - 6x^2 + 6$ | $20. g(g(x)) = 2(2x+1) + 1$ $= 4x + 2 + 1$ $= 4x + 3$        |

Find the following composite functions given  $f(x) = 2x + 9$  and  $g(x) = \frac{3}{x}$ .

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| $21. f \circ g(x) = 2\left(\frac{3}{x}\right) + 9$ $= \frac{6}{x} + 9$ | $22. g \circ f(x) = \frac{3}{2x+9}$  |
| $23. f \circ f(x) = 2(2x+9) + 9$ $= 4x + 18 + 9$ $= 4x + 27$           | $24. g \circ g(x) = \frac{\frac{3}{x}}{\frac{3}{x}}$ $= 3 \cdot \frac{x}{3}$ $= x$ |